Centro Clima
CENTRO DE ESTUDOS INTEGRADOS SOBRE MEIO AMBIENTE E MUDANÇAS CLIMÁTICAS

Center for Integrated Studies on Climate Change and the Environment

Federal University of Rio de Janeiro – Brazil

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Residential and Transportation scenario for LCS study Brazil Case Report of last year's activity

2008 AIM Training Workshop

William Wills

ww@ufrj.br

Tsukuba, Japan

October 28, 2008

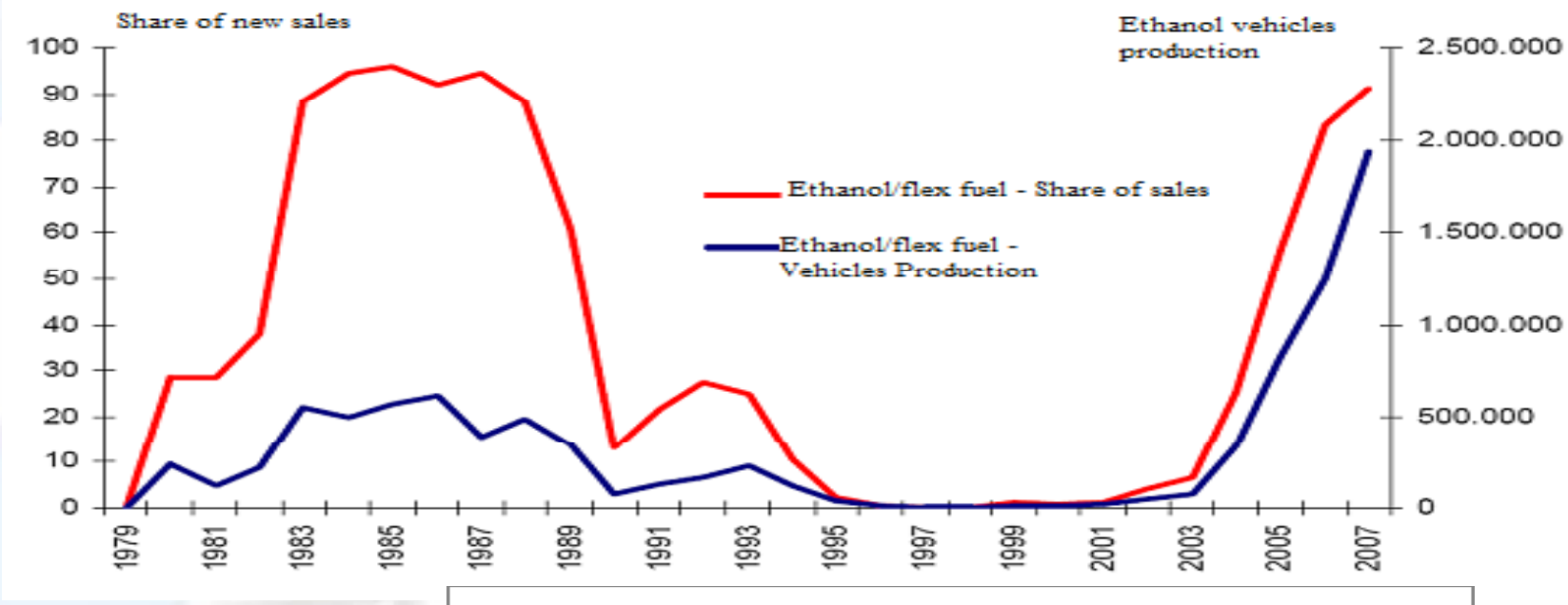
Continnuing from last section...

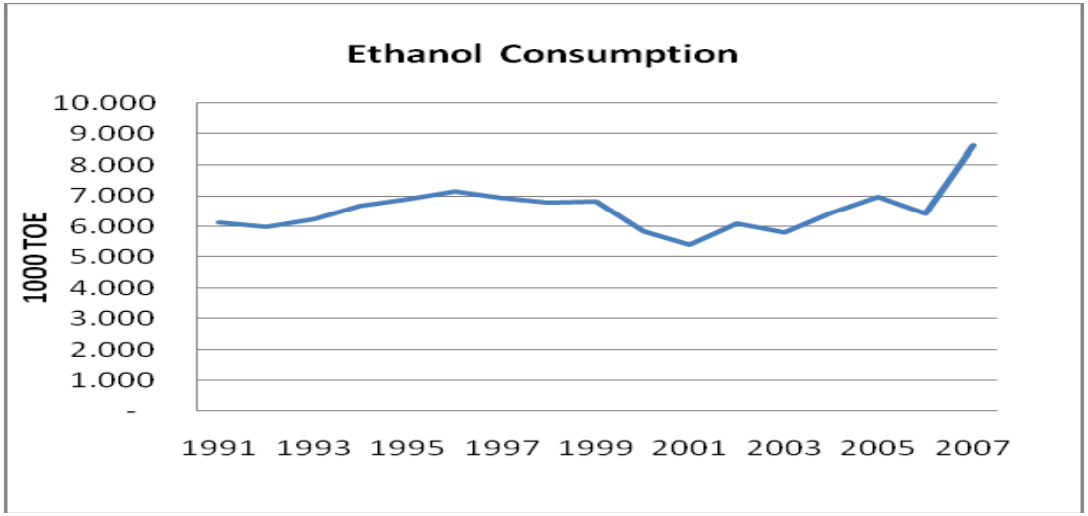
Ethanol production in Brazil

X

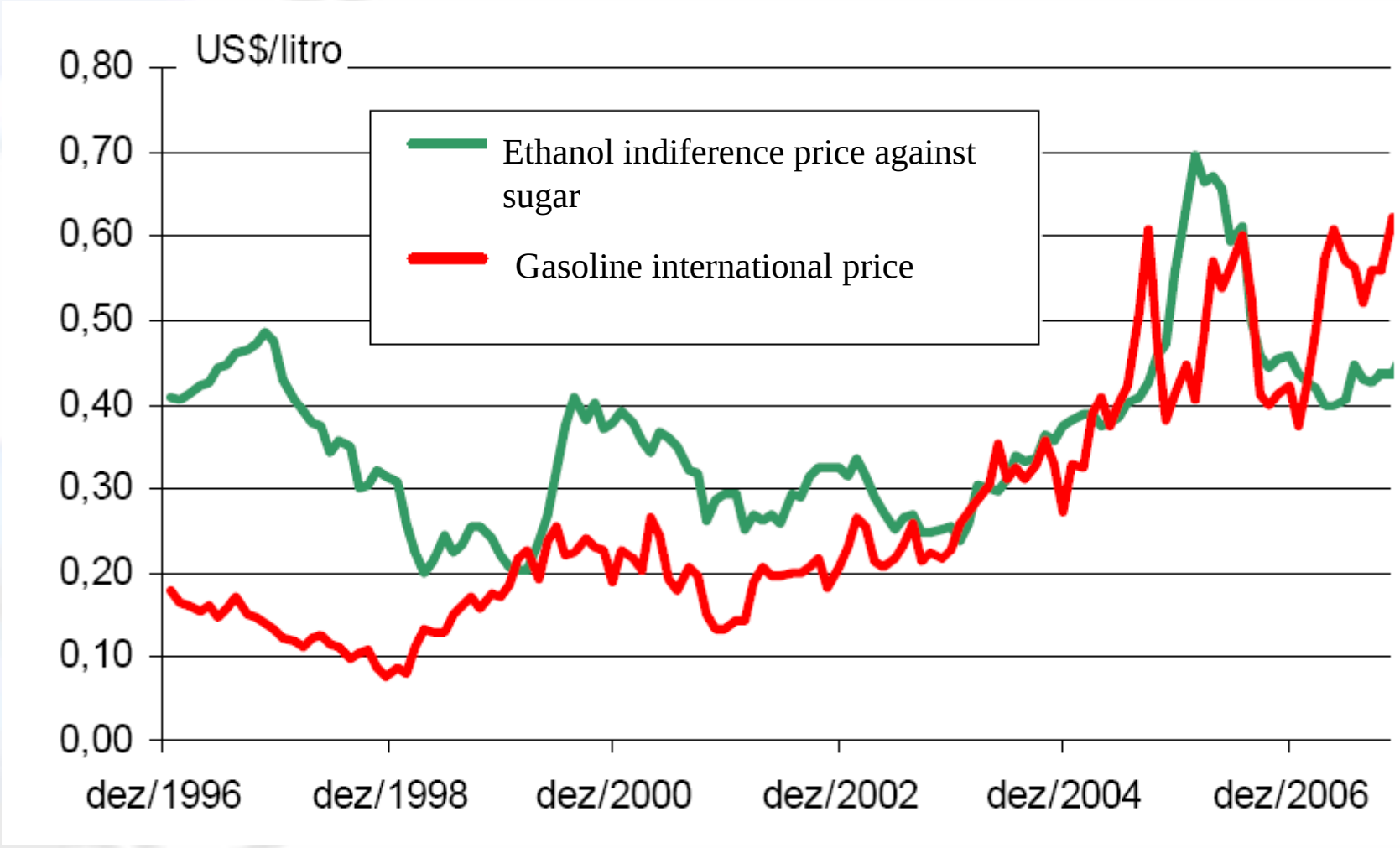
Oil Price

Interesting LCS Activities from last year

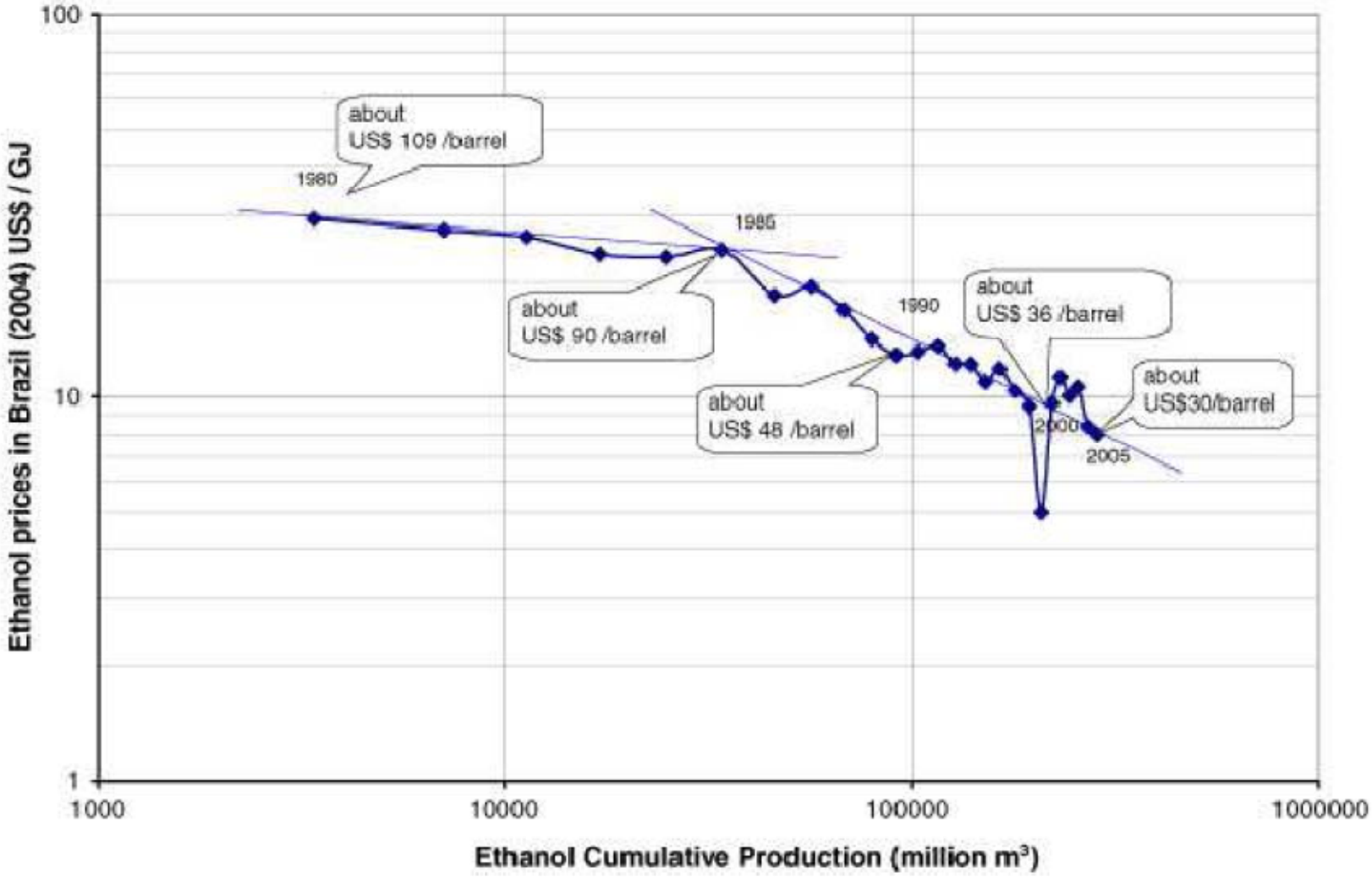




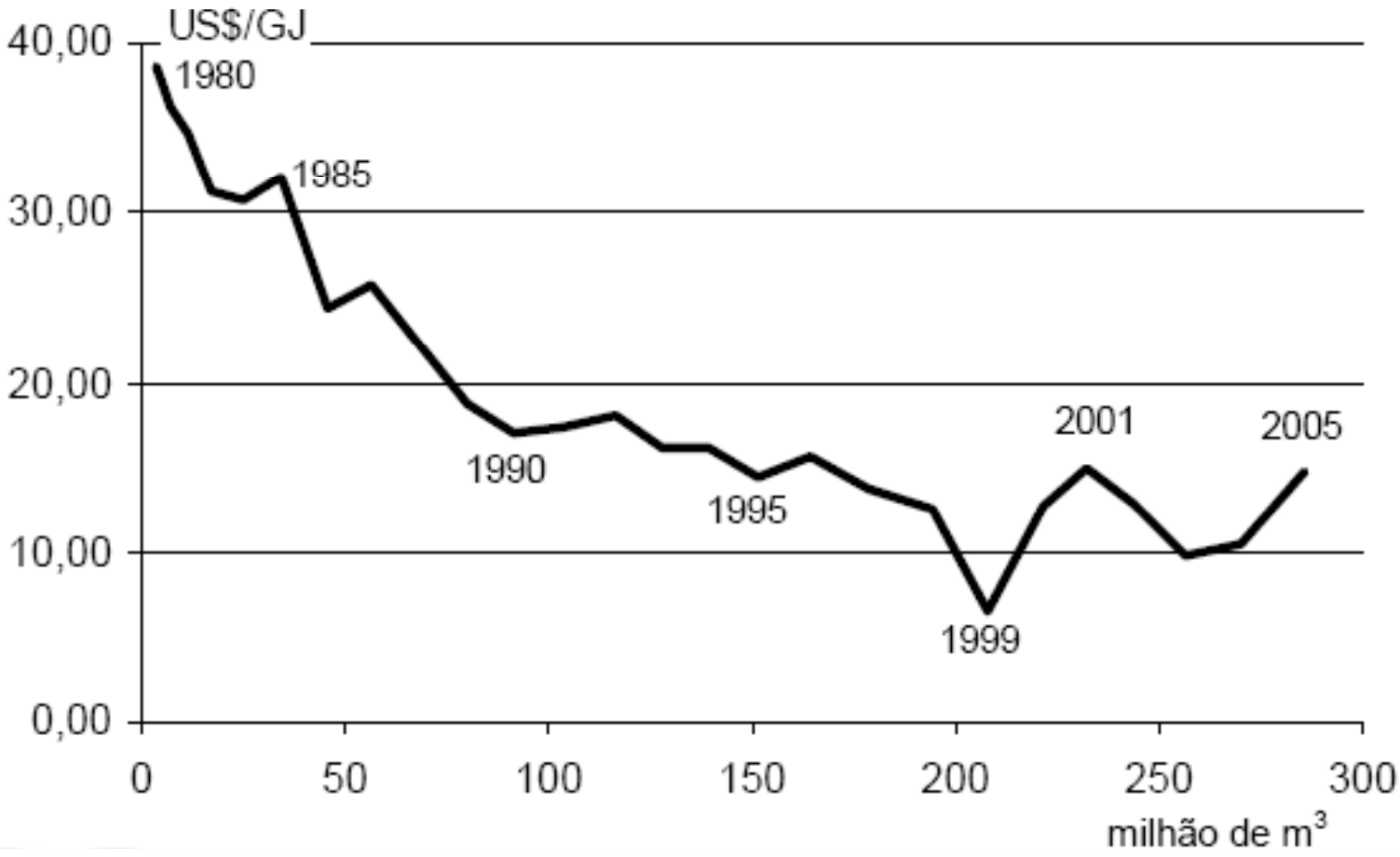
Ethanol x Sugar x Gasoline



Ethanol Learning Curve



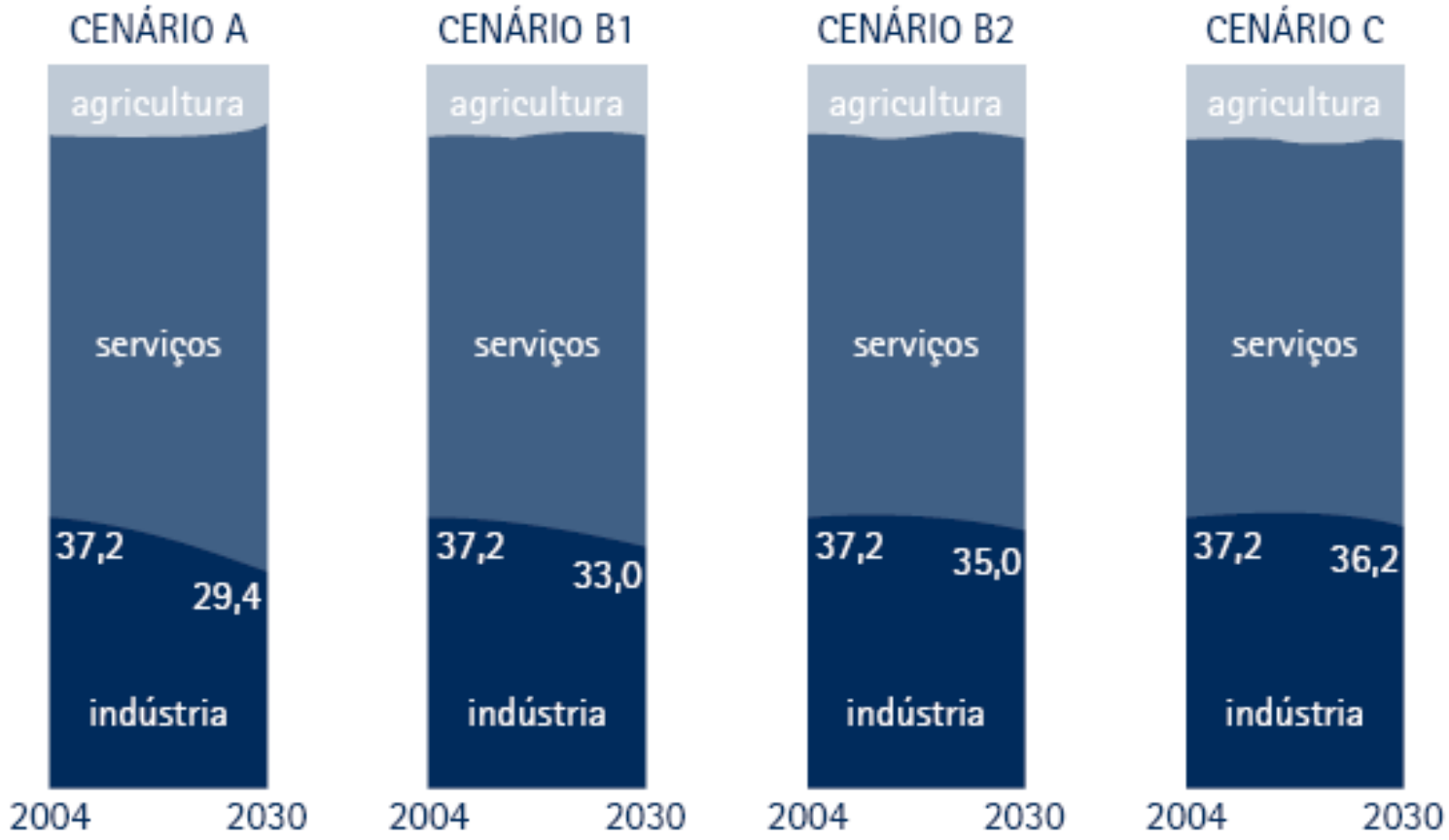
Price paid to producers



Overall assumptions in 2008

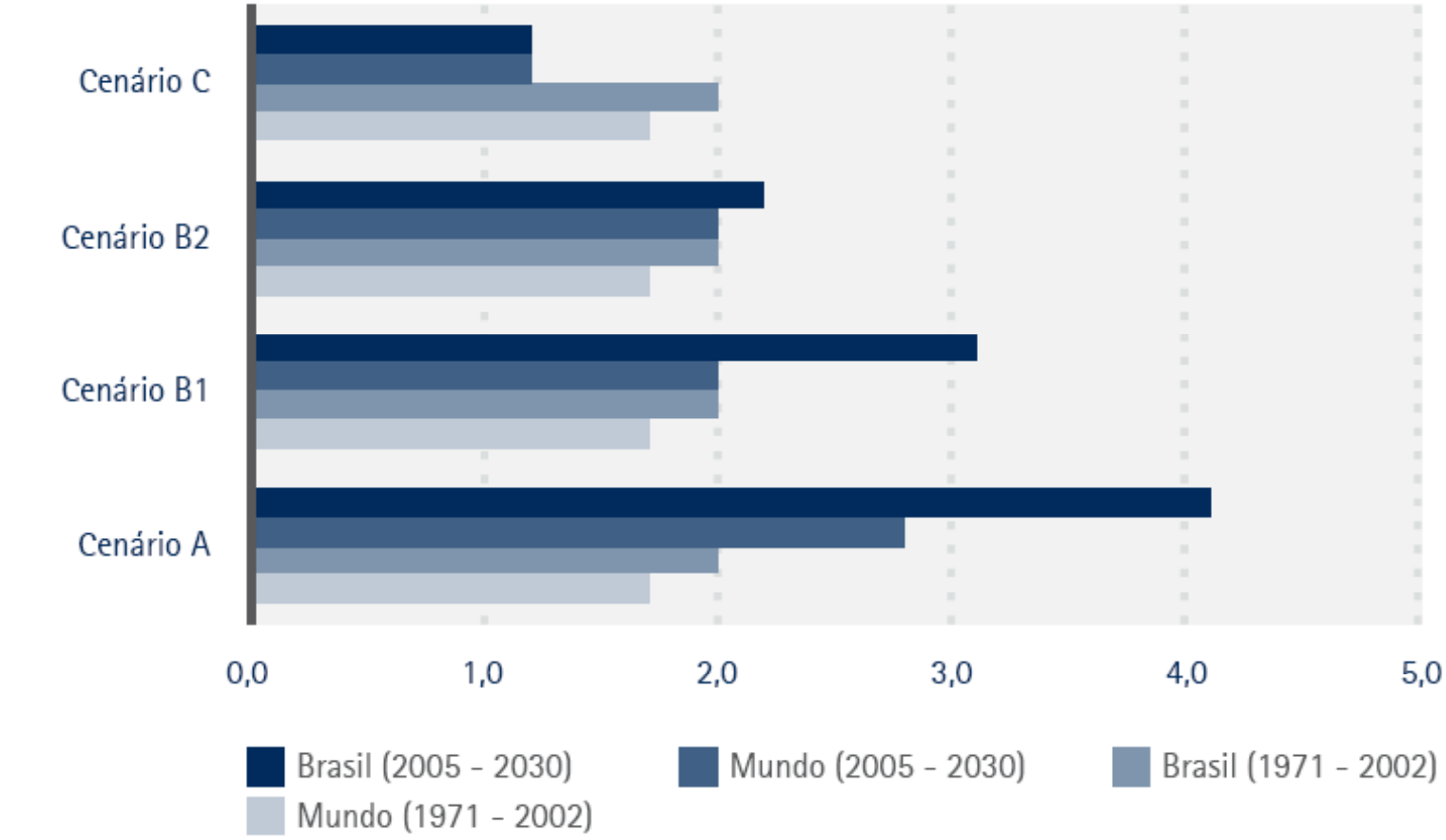
- Policy Implementation - Actions
  - Enhancing biodiesel production
  - Reducing Amazon deforestation
- Focus on BCM model utilization
- Main options considered for mitigation
  - Efficiency
  - Enhancing biodiesel production and use
  - Fuel Shift on PWR sector

GDP Distribution (2004 – 2030)



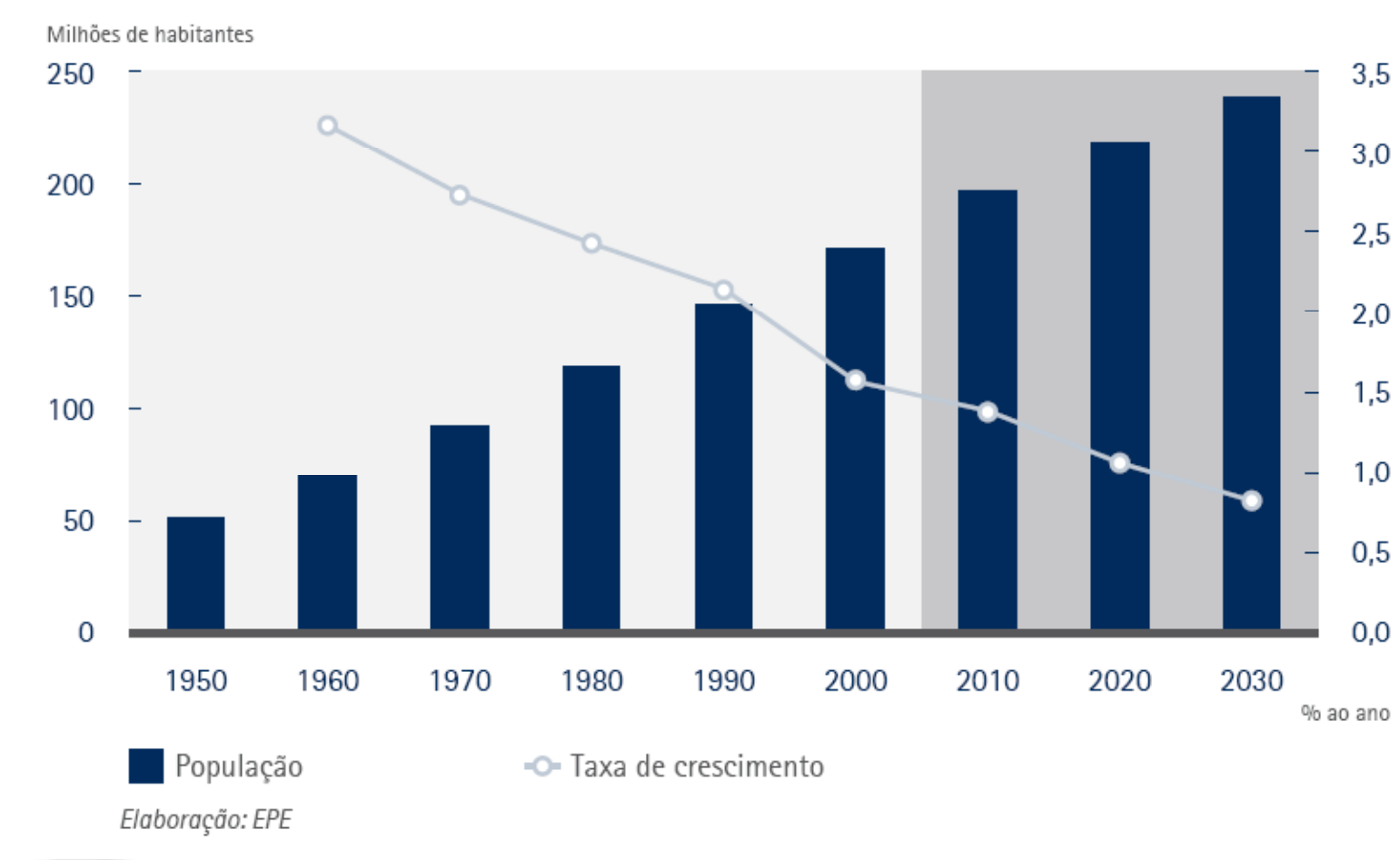
Elaboração: EPE

GDP per Capita (% per year)



Elaboração: EPE

Population

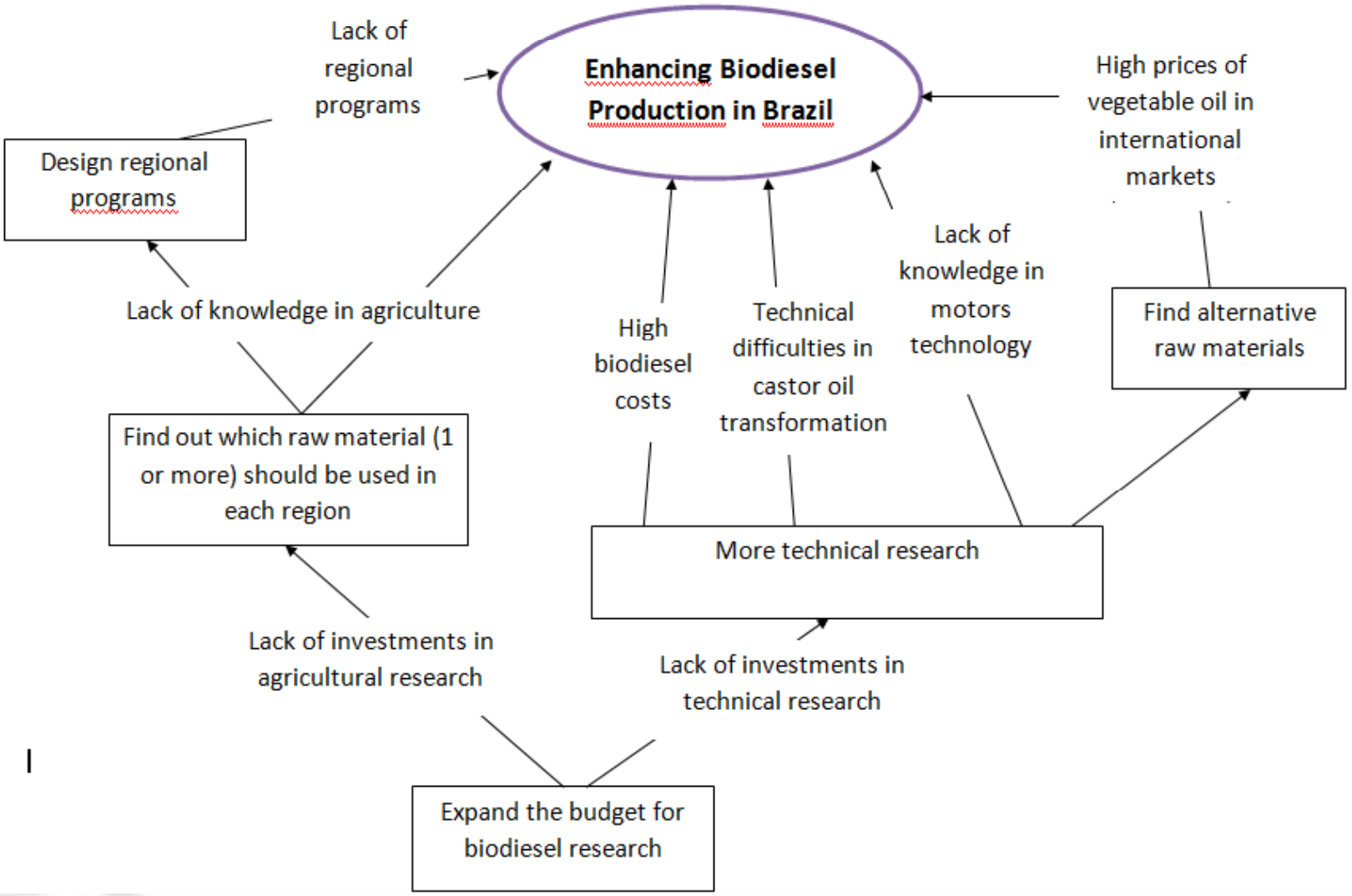

Milhões de habitantes
250
200
150
100
50
0
3,5
3,0
2,5
2,0
1,5
1,0
0,5
0,0
1950
1960
1970
1980
1990
2000
2010
2020
2030
% ao ano
População
Taxa de crescimento
Elaboração: EPE

Key information - 2007

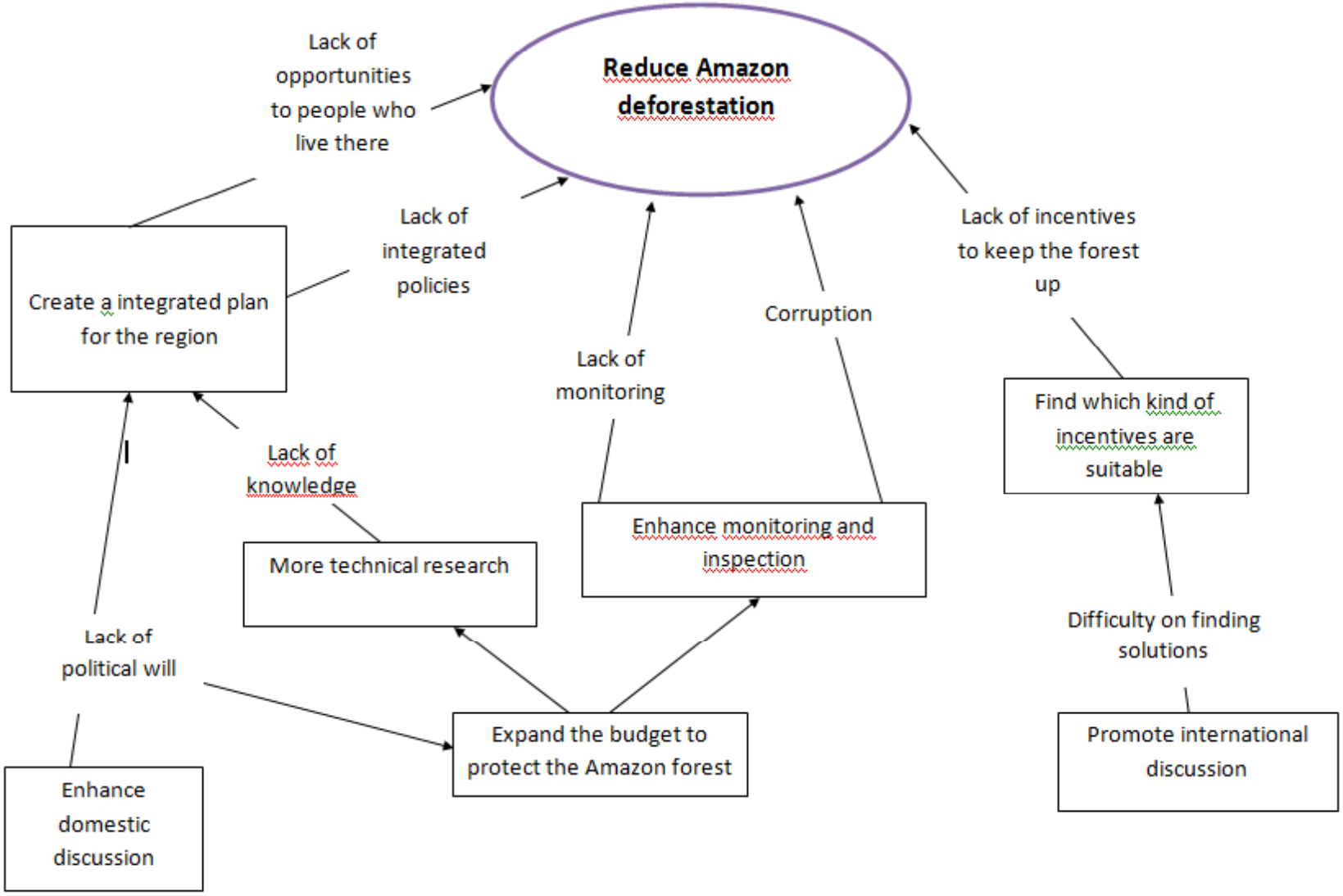
	2000	2006	2030
Population, total	173.9 million	188.7 million	238 million
Population growth (annual %)	1.5	1.2	0.8
GDP per capita, (current 1000 US$)	3.8	4.7	7.8 - 15
GDP (current US$)	644.5 billion	1.1 trillion	1.9 – 3.6 trillion
GDP growth (annual %)	4.3	3.7	2.2 – 5.1
Inflation, GDP deflator (annual %)	6.2	4.3	
Agriculture, value added (% of GDP)	5.6	5.1	8 - 12
Industry, value added (% of GDP)	27.7	30.9	29 - 36
Services, etc., value added (% of GDP)	66.7	64.0	63 - 52

Source: World Development Indicators database, April 2007

Policy Implementation – Action 1



Policy Implementation – Action 2



Policy Implementation – Action 2

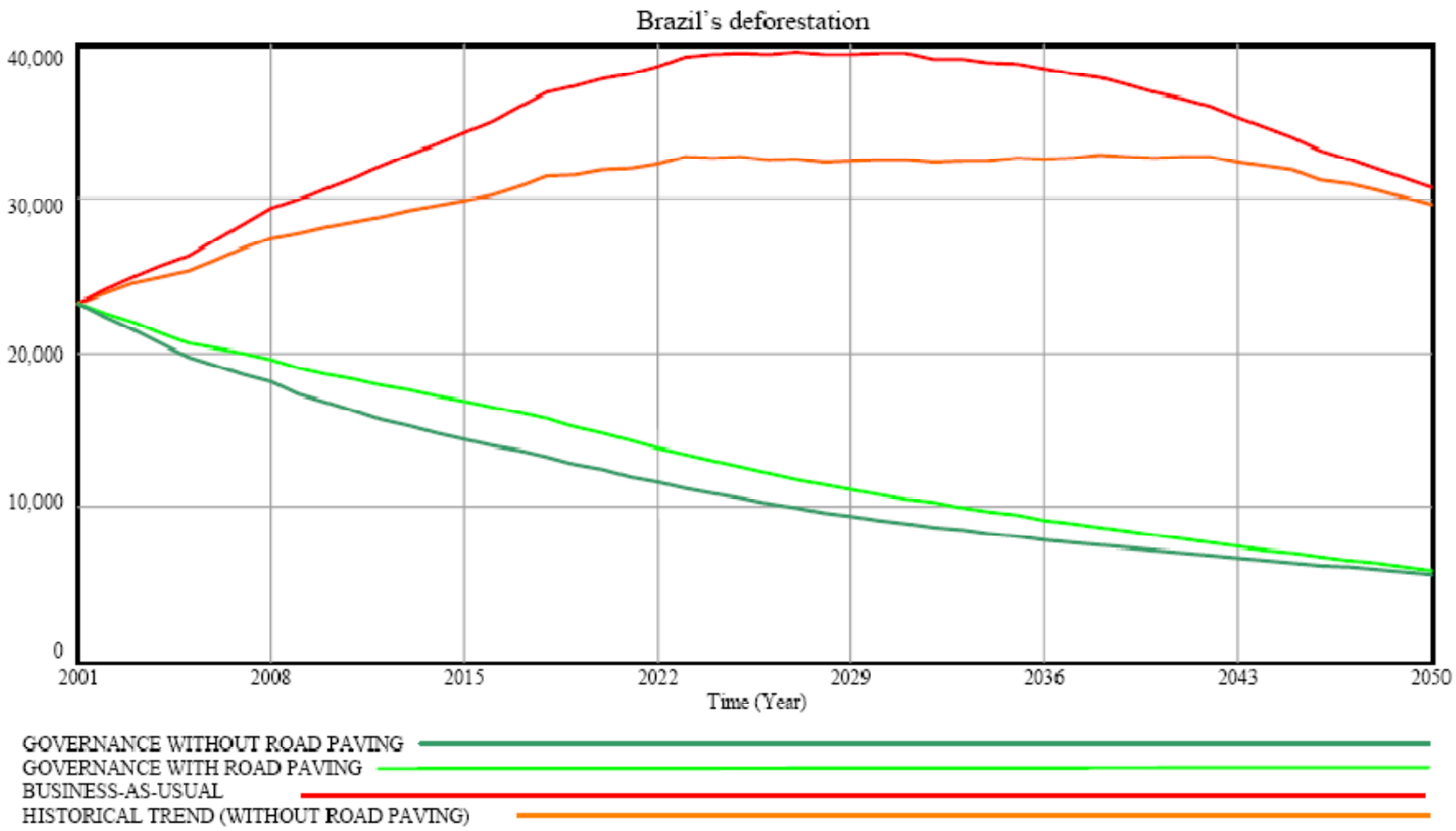


Figure 3.8.2 Projected deforestation until 2050, under different scenarios for the Brazilian Amazonia (Silveira et al., 2005).

Backcasting Model

- 5 actions implemented
  1. Enhancing biodiesel use in small freigth
  2. Enhancing biodiesel use in large freigth
  3. Enhancing biodiesel use in buses
     - 2% biodiesel in 2005 to 100% biodiesel in 2050
  4. Enhancing energy efficiency in refrigerators
     - 50% efficiency increase until 2050
  5. Shifting from oil to biomas in the PWR sector
     - 6 Mtoe substitution (2/3)

Residential sector

1 Energy service demand

	Unit	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
COOL		1,0	1,05	1,1	1,13	1,15	1,18	1,2	1,23	1,25	1,28	1,3
WARM		1,0	1,05	1,1	1,13	1,15	1,18	1,2	1,23	1,25	1,28	1,3
HWT		1,0	1,05	1,1	1,13	1,15	1,18	1,2	1,23	1,25	1,28	1,3
COOK		1,0	1,05	1,1	1,13	1,15	1,18	1,2	1,23	1,25	1,28	1,3
LIGHT		1,0	1,05	1,1	1,13	1,15	1,18	1,2	1,23	1,25	1,28	1,3
REF		1,0	1,05	1,1	1,13	1,15	1,18	1,2	1,23	1,25	1,28	1,3
TV		1,0	1,05	1,1	1,13	1,15	1,18	1,2	1,23	1,25	1,28	1,3
APP		1,0	1,05	1,1	1,13	1,15	1,18	1,2	1,23	1,25	1,28	1,3

CM

2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
1,0	1,05	1,1	1,13	1,15	1,18	1,2	1,23	1,25	1,28	1,3
1,0	1,05	1,1	1,13	1,15	1,18	1,2	1,23	1,25	1,28	1,3
1,0	1,05	1,1	1,13	1,15	1,18	1,2	1,23	1,25	1,28	1,3
1,0	1,05	1,1	1,13	1,15	1,18	1,2	1,23	1,25	1,28	1,3
1,0	1,05	1,1	1,13	1,15	1,18	1,2	1,23	1,25	1,28	1,3
1,0	1,05	1,1	1,13	1,15	1,18	1,2	1,23	1,25	1,28	1,3
1,0	1,05	1,1	1,13	1,15	1,18	1,2	1,23	1,25	1,28	1,3
1,0	1,05	1,1	1,13	1,15	1,18	1,2	1,23	1,25	1,28	1,3

Freight Transportation sector

Energy service demand

	Unit	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
FV_M	B t-km	1,0	1,1	1,1	1,2	1,2	1,3	1,3	1,4	1,4	1,5	1,5
FV_L	B t-km	1,0	1,1	1,1	1,2	1,2	1,3	1,3	1,4	1,4	1,5	1,5
TRN	B t-km	1,0	1,1	1,1	1,2	1,2	1,3	1,3	1,4	1,4	1,5	1,5
SHP	B t-km	1,0	1,1	1,1	1,2	1,2	1,3	1,3	1,4	1,4	1,5	1,5
AIR	B t-km	1,0	1,1	1,1	1,2	1,2	1,3	1,3	1,4	1,4	1,5	1,5

CM

2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
1,0	1,1	1,1	1,2	1,2	1,3	1,3	1,4	1,4	1,5	1,5
1,0	1,1	1,1	1,2	1,2	1,3	1,3	1,4	1,4	1,5	1,5
1,0	1,1	1,1	1,2	1,2	1,3	1,3	1,4	1,4	1,5	1,5
1,0	1,1	1,1	1,2	1,2	1,3	1,3	1,4	1,4	1,5	1,5
1,0	1,1	1,1	1,2	1,2	1,3	1,3	1,4	1,4	1,5	1,5

Passenger Transportation sector

Energy service demand

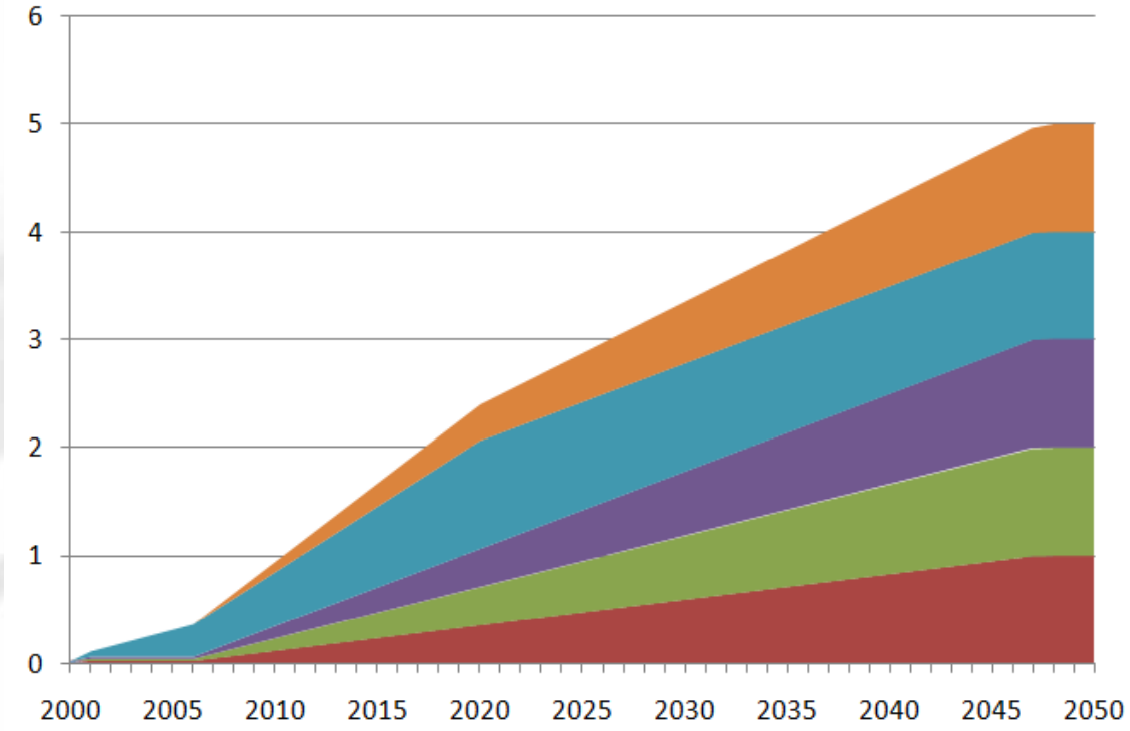
	Unit	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
PPV_S	B p-km	1,0	1,1	1,1	1,2	1,2	1,3	1,3	1,3	1,3	1,2	1,2
PPV_M	B p-km	1,0	1,1	1,1	1,2	1,2	1,3	1,3	1,3	1,3	1,2	1,2
PPV_L	B p-km	1,0	1,1	1,1	1,2	1,2	1,3	1,3	1,3	1,3	1,2	1,2
CPV	B p-km	1,0	1,1	1,1	1,2	1,2	1,3	1,3	1,3	1,4	1,4	1,4
BUS	B p-km	1,0	1,1	1,1	1,2	1,2	1,3	1,3	1,3	1,4	1,4	1,4
TRN	B p-km	1,0	1,1	1,1	1,2	1,2	1,3	1,3	1,3	1,4	1,4	1,4
SHP	B p-km	1,0	1,1	1,1	1,2	1,2	1,3	1,3	1,3	1,4	1,4	1,4
AIR	B p-km	1,0	1,1	1,1	1,2	1,2	1,3	1,3	1,3	1,4	1,4	1,4

CM

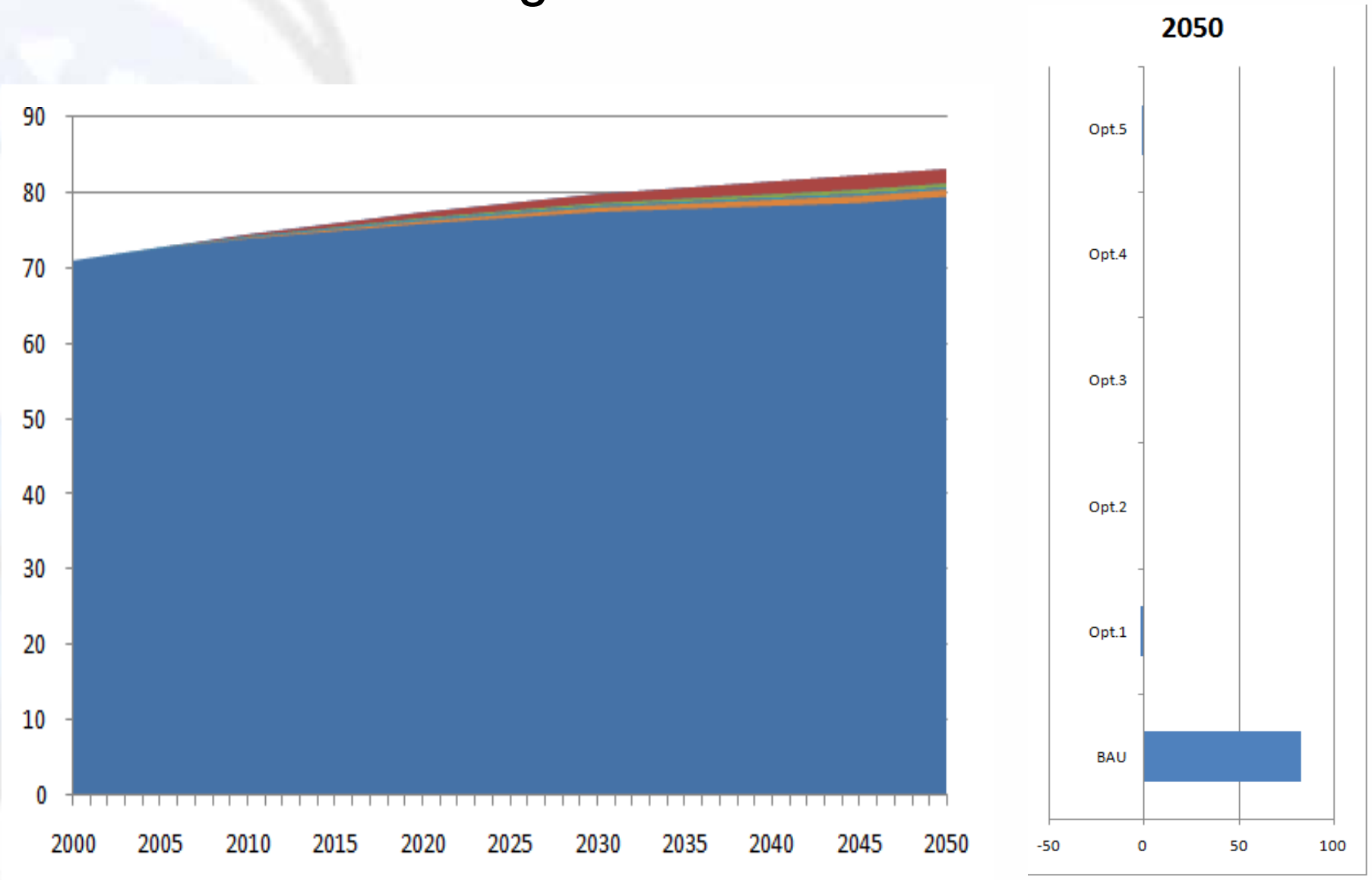
2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
1,0	1,1	1,1	1,2	1,2	1,3	1,3	1,3	1,3	1,2	1,2
1,0	1,1	1,1	1,2	1,2	1,3	1,3	1,3	1,3	1,2	1,2
1,0	1,1	1,1	1,2	1,2	1,3	1,3	1,3	1,3	1,2	1,2
1,0	1,1	1,1	1,2	1,2	1,3	1,3	1,3	1,4	1,4	1,4
1,0	1,1	1,1	1,2	1,2	1,3	1,3	1,3	1,4	1,4	1,4
1,0	1,1	1,1	1,2	1,2	1,3	1,3	1,3	1,4	1,4	1,4
1,0	1,1	1,1	1,2	1,2	1,3	1,3	1,3	1,4	1,4	1,4
1,0	1,1	1,1	1,2	1,2	1,3	1,3	1,3	1,4	1,4	1,4

Backcasting Model - Penetration

1	Enhance biodiesel use - MF											
		%	0%	2%	12%	23%	35%	47%	59%	71%	83%	95%	100%
2	Enhance Biodiesel Use - LF											
		%	0%	2%	12%	24%	35%	47%	59%	71%	83%	95%	100%
3	Enhance Biodiesel Use - Bus											
		%	0%	2%	12%	23%	35%	47%	59%	71%	83%	95%	100%
4	Energy efficiency - Refrigerator											
		%	0%	25%	50%	75%	100%	100%	100%	100%	100%	100%	100%
5	Shift from Oil to Biomass - PWR											
		%	0%	0%	10%	21%	33%	45%	57%	69%	81%	93%	100%



Backcasting Model - CO2 Results



Future Work

- Implement all other actions in the Backcasting Model;
- Check for new oficial data available to update BAU scenario;
- Check goals for energy eficiency in the National Energy Plan 2030;
- Assess other important trends and put them in CM scenario.
- Considering costs of actions

Discussion Points

- Linked Models (ESS and BCM)
- BCM: Graphics by sector; Dificult to implement an action for a hole sector; Bugs; Could be integrated with the ESS Model and offer same graphs.
- AFOLU, IPPU, Waste - How to adress actions using ESS and BCT